N. C. LOCKE.

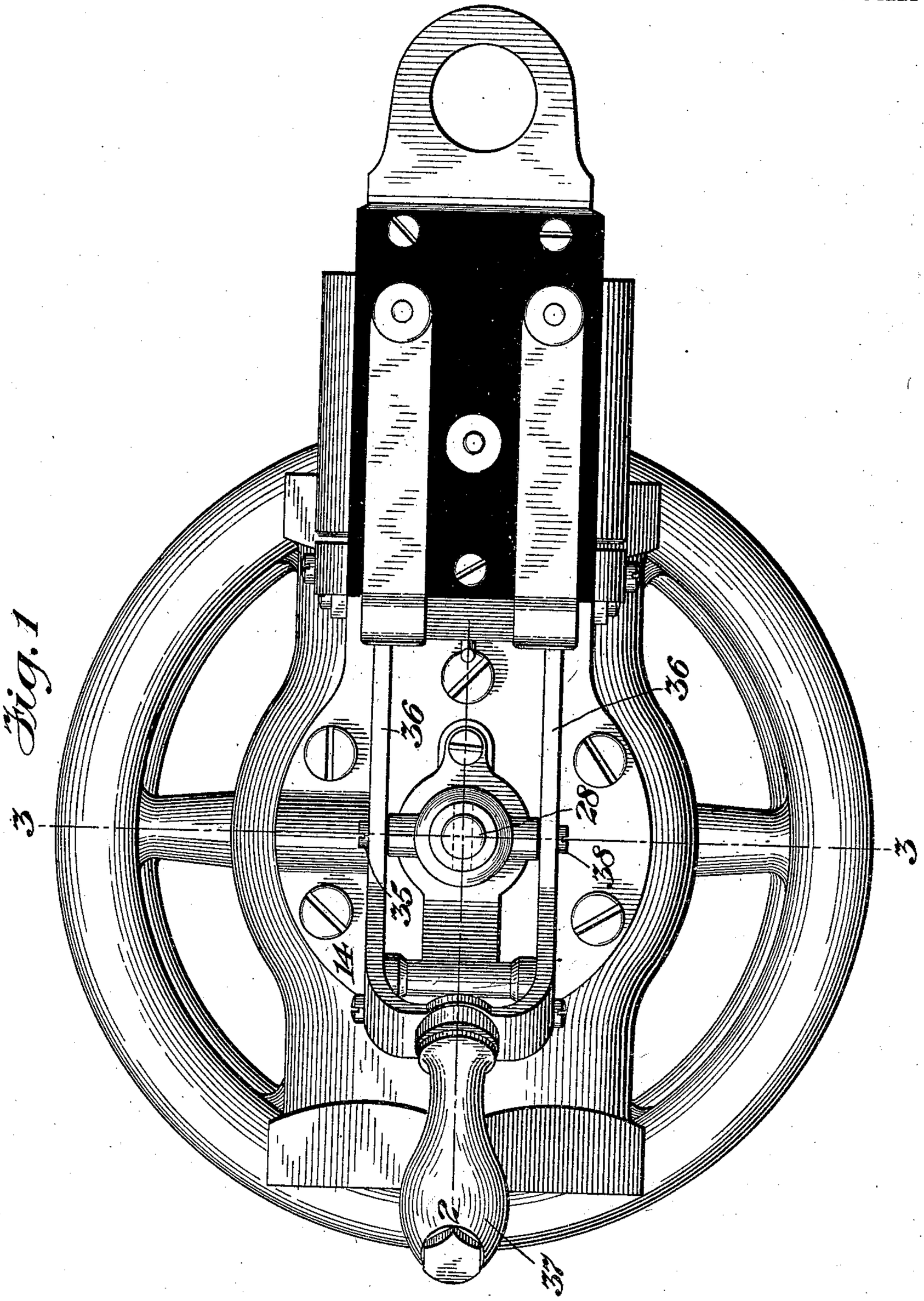
AUTOMATIC ENGINE STOP.

APPLICATION FILED AUG. 6, 1907.

956,380.

Patented Apr. 26, 1910.

3 SHEETS—SHEET 1.



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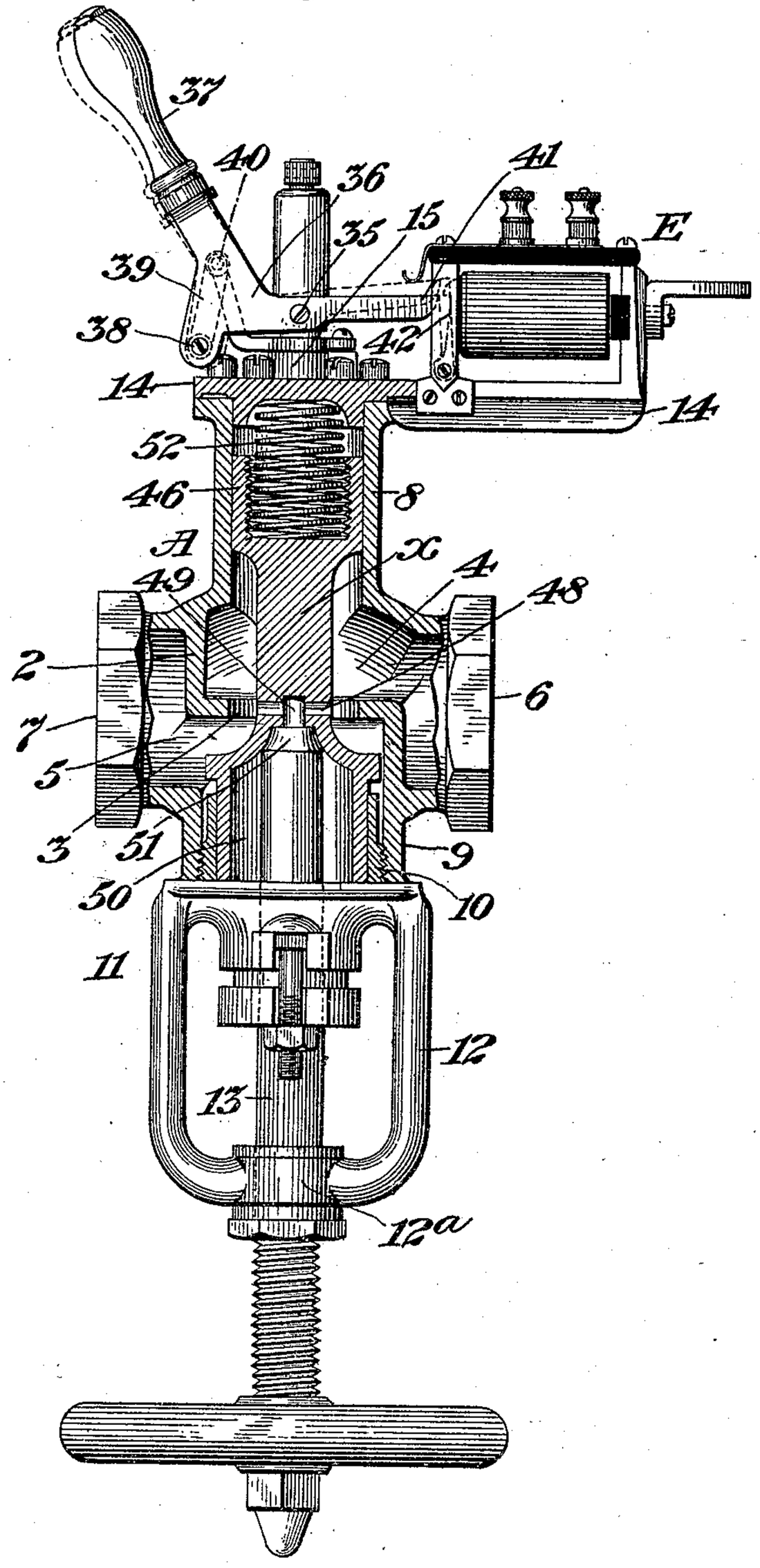
3 SHEETS—SHEET 2.

Fig. 2



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3 SHEETS—SHEET 3.

Fig. 3

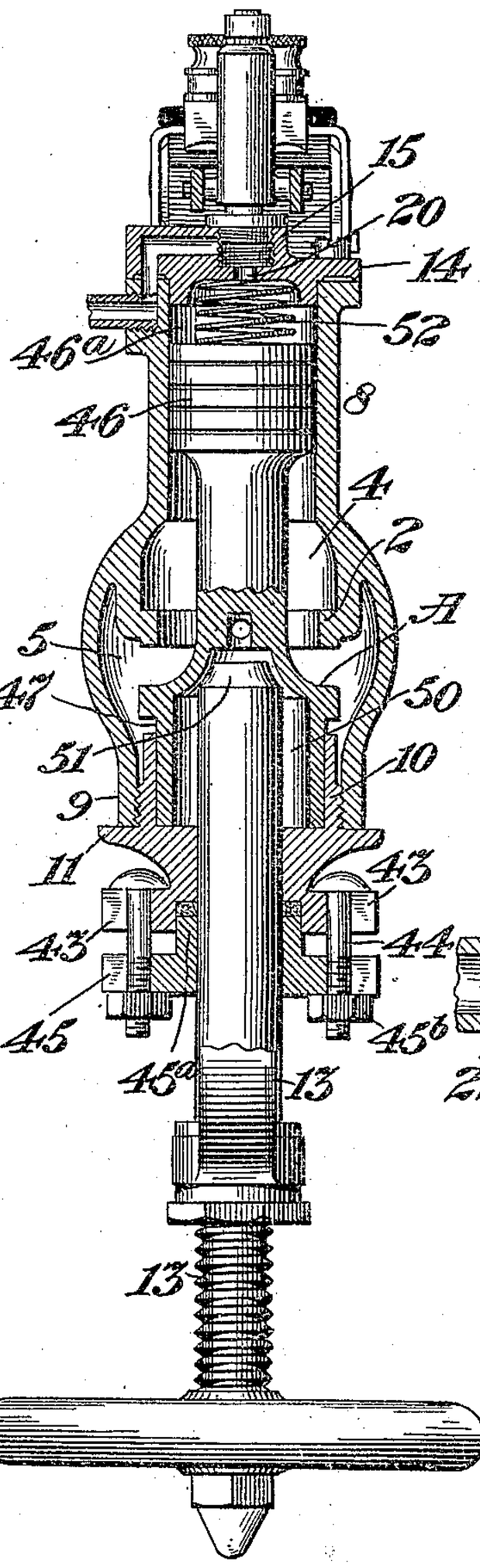
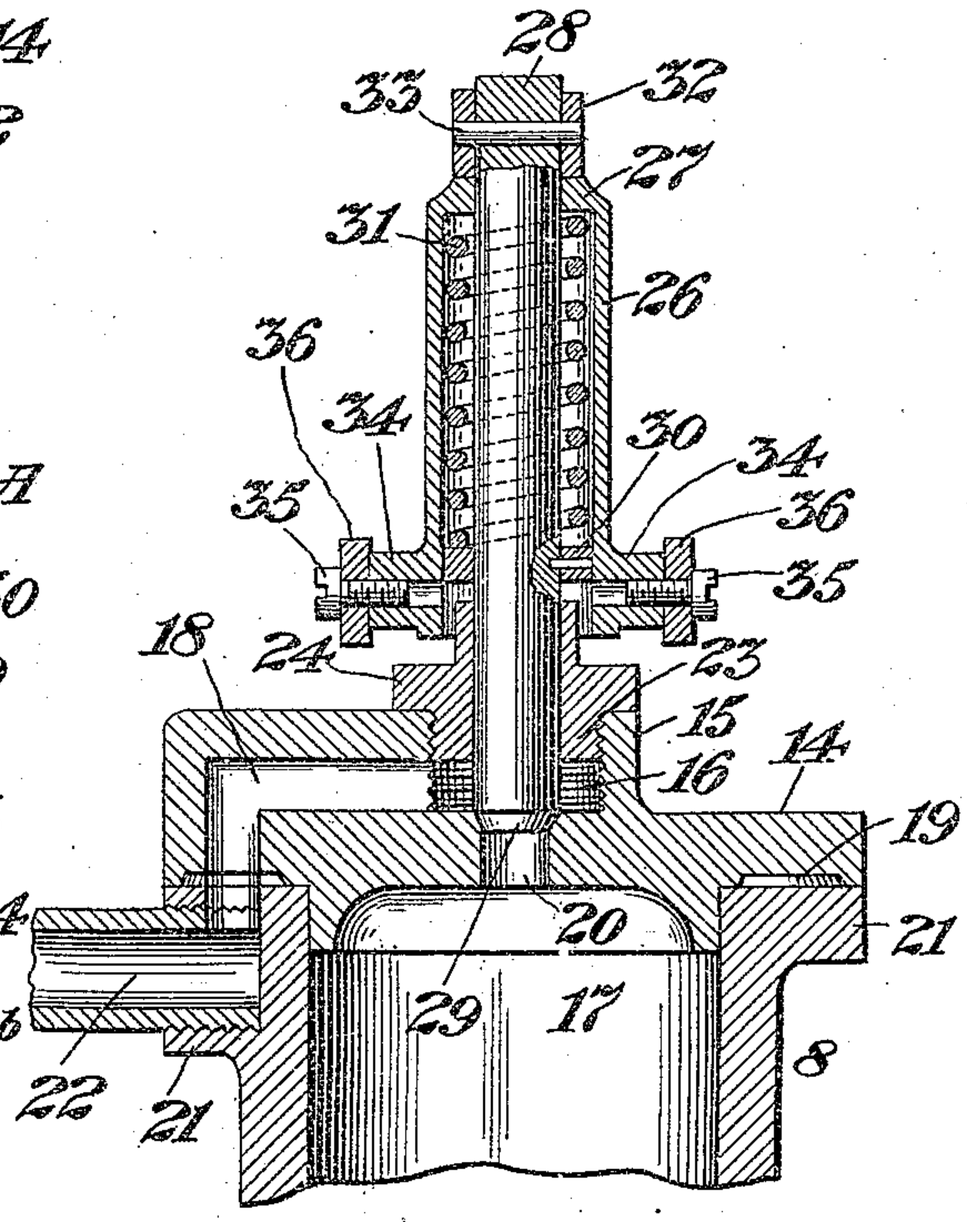


Fig. 4



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UNITED STATES PATENT OFFICE.

NATHANIEL CHASE LOCKE, OF SALEM, MASSACHUSETTS.

AUTOMATIC ENGINE-STOP.

956,380. Specification of Letters Patent. Patented Apr. 26, 1910.

Application filed August 6, 1907. Serial No. 387,287.

To all whom it may concern:

Be it known that I, NATHANIEL CHASE LOCKE, citizen of the United States of America, residing at Salem, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Automatic Engine-Stops, of which the following is a specification, reference being had therein to the accompanying drawings.

The object of this invention is to produce a compact and economically constructed automatic engine-stop that is particularly suitable for comparatively small engines, such, for an approximate example, as an engine whose steam-supply pipe from the boiler is $3\frac{1}{2}$ inches or less.

Heretofore, the automatic engine stops in use have generally cost about as much for engines having small steam-supply pipes and small throttle-valves between boiler and engine as for larger engines, the cost being disproportionate.

Of course my new stop may be made of any desired size; and whatever its size it possesses the advantage of high efficiency and of compactness due to the incorporation of requisite mechanical factors in a single casing, to which is attached an exhaust-valve and electro-mechanical apparatus for effecting the automatic unseating of the exhaust-valve and the consequent automatic seating of the throttle-valve beween the boiler and engine.

In the drawings, Figure 1 is a top-plan view of my new automatic engine-stop; Fig. 2 is a vertical, central section, at line 2—2, of Fig. 1; Fig. 3 is a vertical, central section, at line 3—3, of Fig. 1; and Fig. 4 is an enlarged sectional view of the exhaust-valve detached from the electro-mechanical apparatus, the section being at line 3—3 of Fig. 1.

Referring to the drawings, which illustrate the principle of my invention, and the best mode now known to me of applying that principle, A is the casing of the throttle-valve 1 and its attached pistons; 2 is a partition having a steamway 3 through it and dividing the casing into a boiler-steam chamber and an engine-steam chamber 5; 6 is the inlet from the boiler into chamber 4, and 7 is the outlet to the engine from the engine-steam chamber 5; 8 indicates a piston cylinder extension of casing A on its boiler-steam chamber side, and 9 is a piston cylinder extension of casing A on its engine-steam chamber side, the piston cylinder extensions 8 and 9 being in line one with another; 10, in the particular form of construction shown, is a threaded piston-ring which screws into the open end of piston cylinder 9 and which is an integral projection of the end-plate 11 of the casing on its engine-steam chamber side. This end-plate 11 is provided with a bracket 12 carrying a threaded spindle 13 which extends inwardly through end-plate 11 into casing A, the threaded portion of the spindle passing through the internally threaded portion 12^a of the bracket; 14 is the end-plate of the piston cylinder extension 8, and is formed with an outwardly extending cylindrical boss 15 to form an exhaust-steam chamber 16.

An exhaust-steamway 17 is formed in the bottom of chamber 16 and connects this chamber with the interior of piston cylinder 8. Plate 14 is also formed with a lateral exhaust-steamway 18 which leads from chamber 16 into an annular groove 19 on the under side of plate 14, the under side of which is also provided with an annular rib 20 that fits into the open end of piston cylinder extension 8, the outer end of which forms a wall of the annular groove 19 so that an annular chamber is thereby formed for catching moisture of condensation, if any, due to leakage of steam past the joint formed by rib 20 and cylinder 8. The exhaust-steamway 18 discharges into this annular chamber, and the exhaust steam passes through the steamway 20 in flange 21 of casing A, said flange being provided with an exhaust 22 to the open air, sewer, or otherwise as preferred.

The upper wall of steam-exhaust chamber 16 is formed by the inner threaded boss 23 of the bracket 24, the boss screwing into a threaded orifice in the outer side of end-plate 14. Bracket 24 is provided, opposite boss 23, with a cylindrical boss 25, on which is telescopically mounted a cylindrical casing 26, the outer end 27 of which is partially closed, but provided with an opening for passage of the valve-rod 28 which passes through coincident openings in bosses 23 and 25 and bracket 24. The inner end of valve-rod 28 is formed valve-wise at 29 to control the exhaust steamway 20 from piston cylinder 8 into exhaust-steam chamber 16. Within cylinder 26, toward the lower portion thereof, valve-rod 28 is provided with a fixed collar 30, between the upper

side of which and the inner wall of end 27 of the cylinder there is mounted a coiled spring 31 around the valve-rod, the outer end of which projects through end 27 and is provided with a collar 32, which is secured in place by any suitable means, such, for example, as a pin 33. Cylinder 26 is provided with opposite lugs 34, which, by means of pintles 35, are attached to the forked arms 36 of the angular setting-lever 37, which is pivoted at 38 to a U-shaped link 39, the upper ends of which are pivoted at 40 to the setting-lever. The free ends 41 of the arms of the setting-lever are adapted to engage and interlock with a shouldered armature of the electro-mechanical apparatus E which is supported on plate 14.

The electro-mechanical apparatus need not be particularly described, as some forms are old and well known in the art.

When the coils of the electro-mechanical apparatus are energized, the shouldered armature 41 is moved out of interlocking engagement with the ends 41 of the lever, and spring 31 then operates to lift the valve 29 so that exhaust steam passes from piston cylinder 8 through steamway 20 and out through the exhaust steamways 18, 19, 20 and 22.

Piston cylinder-ring 10 is an integral part of the end-plate 11, which on its outer side is provided with opposite ears 43, through which clamping bolts 44 extend through flanges 45 of the stuffing-box 45ª, the spindle 13 passing through the stuffing-box and the perforation of end-plate 11.

By adjustment of the ends 45ᵇ on the clamp-bolts 44, the stuffing-box may be regulated with reference to end-plate 11.

Throttle-valve 1 is provided, on each of its sides, with pistons,—on its boiler-steam chamber side with piston 46 which slides in piston cylinder extension 8, the piston 46 being loose enough in piston cylinder 8 to permit leakage of steam past it into the chamber 46ª between the outer end of piston 46 and the inner side of plate 14, and out of which chamber the exhaust steamway 20 extends.

On its engine-steam chamber side, valve 1 is provided with a cup-shaped piston 47 which slides in piston-ring 10; and on its boiler-steam chamber side, the stem x of the valve is provided with a transverse steamway 48 which opens into a steamway 49, also in the stem or structure of the valve, this steamway 49 communicating with the chamber 50 of the cupped piston 47, into which the inner valve-shaped end 51 of spindle 13 projects, and serves the double purpose, when it is screwed far enough within casing A, to force valve 1 against its seat in partition 2, and then to close the steamway 49. Piston 46 is also preferably cupped, to better hold in place the coiled spring 52 which is interposed between the outer end of piston 46 and the opposed surface of plate 14 in steam-chamber 46ª.

Valve 1, with its attached pistons 46 and 47, is a steam-balanced structure. Piston 46 is a substantially steam-balanced structure, spring 52 serving to securely hold valve 1 off its seat in partition 2 when steam is passing from the boiler to the engine. At this time, boiler steam, under boiler-steam pressure, leaks past piston 46 and fills chamber 46ª, which is then closed by the valvular end 29 of the exhaust-valve 28. At the same time, the valvular end 51 of spindle 13 is out of contact with the piston 47, so that steamway 49 is open into chamber 50 of piston 47, and consequently, steam at boiler pressure is also in chamber 50.

If, now, in case of accident or other emergency, armature 42 is released from its engagement with the ends 41 of the setting-lever 32, the spring 31 causes an instant and automatic unseating of the exhaust-valve 28, so that boiler pressure in chamber 46ª is instantly reduced, and the throttle-valve 1 automatically seated to shut off the engine.

When desired, the angular setting-lever 37 is moved to bring its ends 41 into locking engagement with armature 42, at which time the exhaust-valve is firmly seated.

The purpose of spindle 13 is to firmly seat the throttle-valve whenever it is necessary to close down the engine-stop for the purpose of repair or otherwise. The spindle 13 has no function in the active operation of the engine-stop, and may be entirely dispensed with if desired.

By combining the throttle valve 1 with the two pistons 46 and 47 and mounting them into the single casing as described, I am enabled to produce a wholly novel, compact and economical automatic engine-stop.

What I claim is:—

1. An automatic engine-stop comprising a casing having a steam-inlet port and a steam-outlet port and two piston cylinders; a partition within the casing and having a steamway connecting the two chambers at its opposite sides; an end-plate having an exhaust steamway; an automatic exhaust-valve controlling said exhaust steamway; means for effecting the automatic unseating of the exhaust-valve; and a double piston throttle-valve, the throttle-valve being intermediate its pistons, one of which slides in a piston cylinder adjacent to the exhaust steamway and the other of which works in a piston cylinder on the other side of the partition; the stem of the double piston throttle-valve having a steamway into a chamber in one of said pistons whereby the double piston throttle-valve is substantially balanced and a setting lever.

2. An automatic engine-stop comprising a casing having a steam-inlet port and a

steam-outlet port and two piston cylinders; a partition within the casing, and having a steamway connecting the two chambers at its opposite sides; an end-plate having an exhaust steamway; an automatic exhaust-valve controlling said exhaust steamway; means for effecting the automatic unseating of the exhaust-valve; and a double piston throttle-valve, the throttle-valve being intermediate its pistons, one of which slides in a piston cylinder adjacent to the exhaust steamway and the other of which works in a piston cylinder on the other side of the partition; the stem of the double piston throttle-valve having a steamway into a chamber in one of said pistons whereby the double piston throttle-valve is substantially balanced; and a spring interposed between the other piston and the end-plate having said exhaust steamway and a setting lever.

3. The combination, in an automatic engine-stop, of a casing having a steam-inlet, a steam-outlet and an interior partition formed with a steamway of a throttle-valve provided with a chambered piston, and a steamway through said valve into the chamber of said piston; a threaded spindle having a valvular end adapted to close said steamway and to engage and seat the throttle-valve; a piston ring for said piston, the piston ring being integral with an end-plate of the casing; said end plate, a bracket thereon, a stuffing-box for said spindle, and means for clamping the stuffing-box to said end plate, the piston-ring being threaded and screwing into the open end of the casing adjacent to said chambered piston.

4. The combination of an end-plate of the valve, said plate having a threaded projection on one side and a bracket on the other side; of a stuffing box; means for attaching it to the end-plate; and a threaded spindle passing through the stuffing-box and said end-plate.

In testimony whereof I have affixed my signature in presence of two witnesses.

NATHANIEL CHASE LOCKE.

Witnesses:

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A. P. SWASEY.